CHAPTER 3

METHODOLOGY

3.1 INTRODUCTION

This chapter will described a brief explanation of the methodology applied in carried out the project from beginning until the end. In this chapter, the flow chart of the operations involved in order to complete the project was displayed and explained briefly. The methodology of this project consists of several stages as described in Figure 3.1 in this chapter. It also aims to acts as a proper guideline to ensure a smooth flow of the project.

3.2 METHODOLOGY FLOWCHART

Based on the project title, "Simulation of Assembly Line for Production Performance Improvement", the project background and scope of the project were identified and determined. Then, the study on the literature review of this project was implemented in order to gain a better understanding regarding this project. For this research, an automotive manufacturing company that producing a car was selected as the subject of the research.

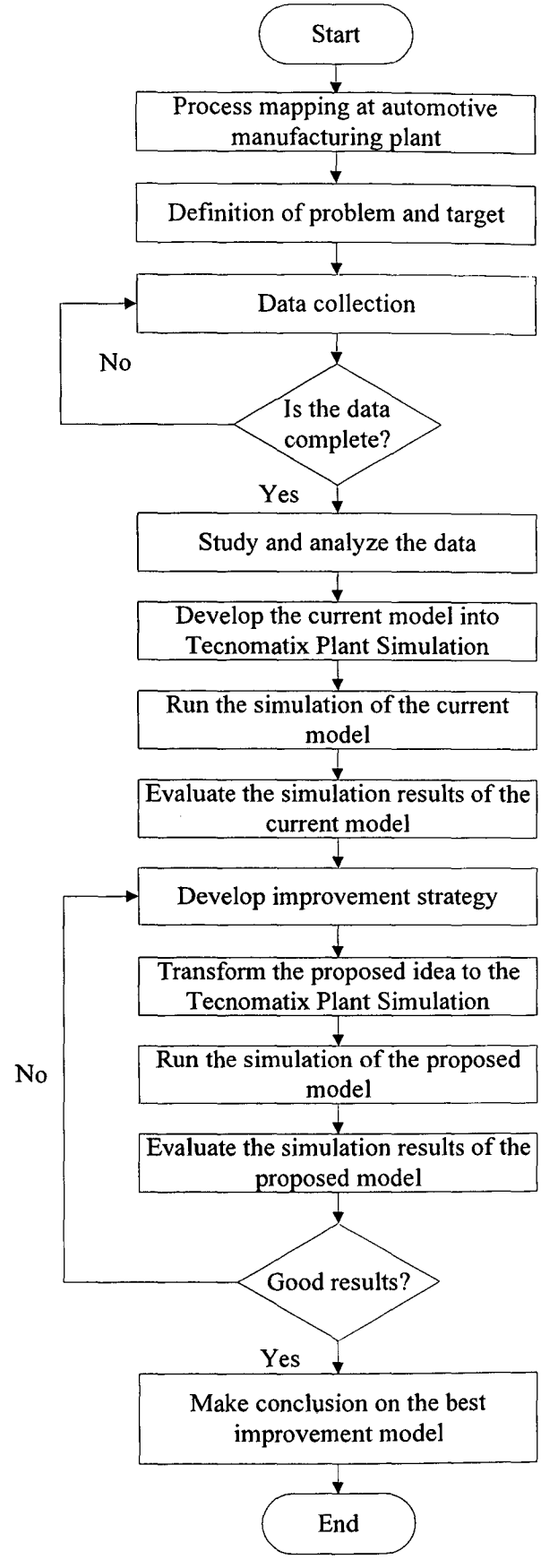

Figure 3.1: Flowchart of the project methodology

The overall project methodology was shown in Figure 3.1. At the initial stage, process mapping is being done at an automotive manufacturing plant. Process mapping is a technique which visually represents the work process. It provides a common understanding of the production process, the flow of each processes and the specific roles and contributions of each worker. Process mapping is crucial in order to understand the whole process first, before any improvement can be done.

Then, the problem and target of this study will be defined. The main problem of this particular production system is the unbalanced cycle time in an assembly line due to several factors such as unbalanced workload allocation, and also inefficient workers itself. The primary objective of the assembly line designers usually is the minimization of workstations or the maximization of line efficiency, while workload balance is a secondary objective. The main reason for this is that as the number of workstations in a line increases the overall cost also increases. Moreover, to achieve the maximum potential of an assembly line its efficiency should be 100%. However, in the case that 100% efficiency is not possible (due to some technological and/or organizational constraints), it was thought that the flow of the line, the output rate, the lead time, and WIP were optimized by reducing the workload differences among workstations.

Next, variation samples of information and data were collected from the automotive manufacturing plant. These included data regarding the company's production line which included the details of the assembly line, type of assembly line model, type of assembly line layout, production process flow, cycle time for each workstations, takt time, production rate, shift details and also number of workers for each workstation. It is crucial at this point to acquire a complete data regarding the production line since these data influenced and contributed to the flow of the study and its outcome. If the data is not completed, another trip to the automotive manufacturing plant need to be scheduled, so that, the data is complete and sufficient enough for this study.

The completed data is studied and analysed to get a better vision on the obtained data and information on the assembly line. For this purpose, all the cycle times which are working